

Appl. No. 10/715,492
Amdt. dated May 19, 2005
Reply to Office Action of January 25, 2005

Amendments to the Claims:

Listing of Claims:

1 - 18. Canceled

19. (Currently Amended) In ~~the~~ a process of sulfur oxide sorption from a gas containing at least one sulfur oxide, wherein said gas is contacted, at an elevated process temperature, with a sorbent material under conditions sufficient to remove sulfur oxide from the gas, the improvement that comprises:

effectively contacting said gas with a solid crystalline sorbent material comprising at least one crystalline material comprising layers of brucite structure comprising about 10 to 30 weight percent magnesia under conditions adapted for the ~~absorption~~ sorption of sulfur oxide from said gas; and

where said sorbent material comprises a chlorite layered structure, said chlorite has been subjected to conditions under which:

a sulfur oxide is ~~absorbed~~ sorbed from a gas containing sulfur oxide onto said chlorite layered structure; and

sulfur values have been desorbed from said chlorite prior to the instant sorption of sulfur oxide from said gas.

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20. (Currently Amended) The ~~improved process of sulfur oxide absorption claimed in claim~~ 19[,] wherein the amount of sulfur oxide removed from said gas in a second ~~absorption~~ sorption step is greater than the amount of sulfur values ~~absorbed~~ sorbed from said gas in a first ~~absorption~~ sorption step.

21. (Currently Amended) The ~~improved process of sulfur oxide absorption according to~~ Claim 19[,] wherein ~~said absorbent~~ the sorbent material further comprises a hydrotalcite.

22. (Currently Amended) The ~~improved process of sulfur oxide absorption according to~~ Claim 19 wherein said solid crystalline sorbent material has deposited thereon an effective amount of oxidative catalyst comprising at least one metal.

23. (Currently Amended) The ~~improved process of sulfur oxide absorption according to~~ Claim ~~23~~ 19 wherein said solid crystalline sorbent material further comprises at least one metal oxide selected from the group consisting of cerium oxide and vanadium pentoxide.

24. (Currently Amended) The ~~improved process of sulfur oxide absorption according to~~ Claim ~~23~~ 19 wherein said ~~phylosilicate~~ sorbent material consists essentially of amesite.

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25. (Currently Amended) The improved process of sulfur oxide absorption according to Claim 19 wherein said solid crystalline sorbent material consists essentially of at least one chlorite and at least one hydrotalcite collectively containing comprising about 14 to 29 wt% magnesia.

26. (Previously Presented) In the a process ~~of~~ for cracking a heavy hydrocarbon feed stock containing sulfur compounds, at a process temperature in the range of about 700° to 820°C and in the presence of a cracking catalyst, to produce a product comprising a gas phase ~~containing~~ comprising at least one sulfur oxide[;] , wherein the process comprises contacting at least a portion of said gas phase under said process conditions with a sufficient quantity of a solid[,] comprising at least one sulfur oxide ~~absorbent~~ sorbent material, to ~~absorb~~ sorb sulfur oxide from said gas;

the improvement comprising:

contacting said gas with a sulfur oxide ~~absorbent~~ sorbent material comprising at least one magnesia-rich layered phyllosilicate having alternating silicate and brucite layers in a first pass;

desorbing sulfur values from said ~~absorbent~~ sorbent material; and

in a second pass, recycling said desorbed phyllosilicate layered ~~absorbent~~ sorbent material in combination with hydrotalcite into effective ~~absorption~~ sorption contact with additional quantities of said sulfur ~~oxide-containing~~ oxide-containing gas, ~~whereby thereby absorbing~~ sorbing more sulfur oxide from said gas in said second pass than in said first pass.

27. (Currently Amended) The process ~~according to~~ of Claim ~~27~~ 26 wherein said phyllosilicate contains about 10-30 weight percent magnesium oxide.

28.(Currently Amended) The process of Claim ~~27~~ 26 wherein said phyllosilicate consists essentially of amesite.

29. (Currently Amended) The process of Claim ~~27~~ 26 wherein said ~~solid sorbent~~ sulfur oxide sorbent material contains hydrotalcite ~~comprising a predominant proportion~~ consisting predominately of magnesia.

30. (Currently Amended) A process for sulfur oxide abatement comprising:
contacting a gas containing sulfur oxide at an elevated process temperature[,] that is sufficient to enable sulfur oxides to be ~~adsorbed~~ sorbed from said gas[,] with a sufficient amount of solid sorbent material to remove sulfur oxide from the gas;

wherein said solid sorbent material comprises at least one layered phyllosilicate having alternating silicate and brucite layers and ~~containing~~ comprising about 10-30 weight percent magnesium oxide.

31. (Currently Amended) The process of Claim ~~31~~ 30 ~~for sulfur oxide abatement~~ wherein the gas includes a vapor phase derived from a process comprising oxidative regeneration of deactivated cracking catalyst; comprising:

forming sulfur dioxide during said oxidative regeneration,
converting said sulfur dioxide to sulfur trioxide by contacting said gas at elevated temperature with solid sorbent material[,] having sulfur oxide sorption ability[,] and having an oxidation ~~catalysis~~ catalyst comprising at least one metal disposed thereon that is adapted to catalyze the conversion of said sulfur dioxide to sulfur trioxide.

32. (Currently Amended) The process of Claim ~~32~~ 31 ~~for sulfur oxide abatement~~ wherein the solid sorbent material is regenerated by desorbing sulfur values therefrom and recycled, ~~thereby~~ whereby the amount of sulfur oxide ~~absorbed~~ sorbed in said recycle operation is increased as compared to the amount of sulfur oxide ~~absorbed~~ sorbed in a first pass of said gas in contact with said solid ~~sorbent/catalyst~~ sorbent material having said oxidation catalyst disposed thereon.

33. (Currently Amended) A sorbent composition comprising a mixture of about 10 to 90 parts by weight of magnesia-rich chlorite ~~containing~~ comprising about 10-30 weight percent MgO; and ~~10 to 90, correspondingly, about 90 to 10 parts~~ by weight of hydrotalcite containing at least about 50 weight percent MgO; wherein at least said chlorite has previously been subjected to ~~absorption~~ sorption of sulfur oxides from a gas and to desorption of ~~absorbed~~ sorbed sulfur

oxides from said chlorite.

34. (Currently Amended) In ~~the~~ a process of sulfur oxide sorption wherein a gas containing sulfur oxide is contacted at an elevated process temperature with a solid sorbent material to remove sulfur oxide from the gas, the improvement which comprises:

contacting said solid sorbent material[,] comprising at least one magnesia-rich crystalline material having a layered structure comprising layers of brucite, wherein the ~~brucite-containing absorbent~~ brucite-containing sorbent material is predominately magnesia, with said gas under ~~absorption~~ sorption conditions;

subjecting said solid sorbent material to desorption of sulfur values; and

recycling said desorbed solid sorbent material to further ~~absorption~~ sorption of sulfur oxides from said gas.

35. (Currently Amended) The process of Claim ~~35~~ 34 wherein the solid sorbent ~~composition material~~ comprises a mixture of magnesia-rich chlorite and hydrotalcite in a weight ratio of about 10:90 to 90:10 chlorite: hydrotalcite.